

Detroit Edison Hart Substation
11736 E. Vernor
Detroit ~~Vicinity~~
Wayne County
Michigan

HAER No. MI-25

HAER
MICH
82-DETRO
43A-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

HAER
MICH
82-DETRO,
43A-

HISTORIC AMERICAN ENGINEERING RECORD

DETROIT EDISON:HART SUBSTATION

HAER No. MI-25

Location: 11736 E. Vernor
Detroit, Michigan, 48214
USGS Belle Isle, Michigan, Quadrangle
UTM Coordinates: 17.337770.4692880

Builder: Albert A. Albrecht Company

Date of Construction: 1914. Addition 1927-28. Altered 1941, 1942

Present Owner: Detroit Edison Company
2000 Second Avenue
Detroit, Michigan 48226

Present Use: Electrical power substation

Significance: The Detroit Edison Hart Substation is typical of the kind of electrical substations built for the Detroit Edison Company in the early 20th century to step down (reduce) high voltage incoming electric current before distribution to residential lines and industrial customers; original equipment also converted incoming alternating current into direct current for streetcar lines. The Hart Substation, furthermore, is associated with the A.A. Albrecht Company, a prominent local builder which constructed Detroit Edison's early power plants and substations. And, thirdly, the Hart Substation is significant in terms of its association with the rapid demographic and economic growth of Detroit during the first three decades of the century, a growth brought about by the organization and concentration of the automobile industry in the city. One leading district of automobile and auto-related companies was along Detroit's far east riverfront, the area serviced by the Hart Substation.

(continued)

DETROIT EDISON HART SUBSTATION
HAER No. MI-25 (Page 2)

Project
Information:

This documentation was undertaken in February, 1988, in accordance with the Memorandum of Agreement between the City of Detroit, the Michigan State Historic Preservation Office, and Chrysler Corporation as a mitigative measure prior to the demolition of the building.

Thomas A. Klug
Instructor of History
Marygrove College
Detroit, Michigan 48221

PART I - HISTORY OF THE DETROIT EDISON HART SUBSTATION

Detroit in 1914--the year the Detroit Edison Hart Substation was built--was in the throes of an economic revolution that had its roots in the mid-19th century. Starting in the 1850s, Detroit enjoyed a long period of rapid growth with a widely-diversified industrial base. After 1900 industrial development in Detroit centered around the automobile industry. Two relevant measures of economic growth were population and territory under the city's jurisdiction. Detroit's population rose from nearly 100,000 in 1870 to 285,000 in 1900, and over the next twenty years increased to 993,000. The city also physically expanded through a series of land annexations extending east and west from Woodward Avenue, Detroit's north-south commercial spine. Detroit covered merely 12 square miles in 1865, filled 23 square miles in 1900, doubled to 46 square miles by 1915, and occupied 79 square miles in 1921.¹

The far east riverfront area served by the Hart Substation did not become part of Detroit until 1906, when the city's eastern border reached Alter Road, the current boundary between Detroit and Grosse Pointe Park.² Until November, 1905, Gilbert Hart (proprietor of the Detroit Emery Wheel Company and president of the Charles A. Strelinger Company) owned the land upon which later the substation was built. Indeed, the Hart Farm Subdivision which he owned encompassed the entire area east of Hillger to Hart, and northwards from Jefferson to Mack. Gilbert Hart sold the Hart Farm Subdivision in November, 1905, to Joseph H. Berry for \$90,000. Joseph Berry, since 1858 chairman of Berry Brothers varnish manufacturers, platted the subdivision in January, 1906, several years in advance of the industrial and residential settlement of the area.³

This part of Detroit experienced explosive growth between 1906 and 1916, based on industrial development, which was primarily related to the automobile industry. The Baist real estate atlas of 1906 shows virtually no development east of Hurlbut Street, more than a half mile west of Hart.⁴ By 1910, however, a good deal of industrial and residential development was evident. A new industrial complex had emerged in the vicinity of Connor's Creek and Connor's Creek Road (now Conner Avenue). This included a foundry and woolen mill at the river's edge; the Chalmers Motor Company plant south of Jefferson; Anderson Forge Machinery Company north of Jefferson and west of Connor's Creek Road; the Hudson Motor Car Company immediately to the east; the Metal Products Company east of Connor's Lane; and the Lozier Motor Car Company on Mack Avenue, at the northern fringe of this district. The residential areas extending five blocks north and south of Jefferson Avenue and west of Connor's Lane typically had houses standing on more than half of the lots platted. Further away

DETROIT EDISON:HART SUBSTATION
HAER No. MI-25 (Page 4)

from Jefferson, about one-tenth of the lots had buildings on them. The area was sufficiently developed that the Michigan Bell Telephone Company had already erected a telephone exchange building at the corner of Hilger and Kercheval, two blocks west of Hart.⁵

Within only six years the region west of Connor's Lane, extending from the Detroit River to three blocks south of Mack Avenue, had developed to the point where there was almost no empty land remaining in either the residential or the industrial areas. From Connor's Lane east to Alter road, the blocks north of and adjacent to Jefferson Avenue typically had houses standing on 60-90% of the lots. The blocks south of Jefferson typically had structures standing on between 20% and 40% of the lots.⁶

A map of the far east riverfront area in 1916 revealed a great deal of industrial activity. A conglomeration of automobile and auto-related firms had developed east of Lycaste, including the Hupp Motor Car Company, Zenith Carburetor, Fairview Foundry (auto castings), and a half dozen others. Continental Motors, which manufactured gasoline engines, built a large factory complex north of Jefferson, east of the Hudson Motor Car Company plant, while the Hudson and Chalmers plants had expanded since 1910. The McCord Manufacturing Company, which made radiators and other auto components, had erected a plant north of Jefferson as well. In July, 1915, Detroit Edison commenced operations at its massive Conner's Creek Generating Plant at the southern end of Lycaste. A year earlier, construction began on Detroit Edison's substation at the intersection of Hart and Waterloo.⁷

The Detroit Edison Hart Substation was erected on lots 76-80, block 2, of the Hart Farm Subdivision (P.C. 687). Peninsular Electric Light Company acquired the property from Robert M. Grindley, a prominent Detroit real estate developer, on July 9, 1913.⁸ Since 1903 the Peninsular company had been a fully-owned subsidiary of the Detroit Edison Company, distributing alternating current to customers throughout Wayne County.⁹ The roots of the Detroit Edison Company went back to the Edison Illuminating Company, a Michigan corporation established in 1886. In the late 1890s, Edison Illuminating absorbed the generating plants and distribution systems of several local, financially-strapped, companies--including Peninsular Electric Light Company. The incorporation of the Detroit Edison Company in January, 1903, began a decade of effort to create a streamlined electricity producing and distributing service in Detroit and environs. In 1915, Detroit Edison--which had confined itself to the operation of power plants--transferred to itself the assets and customers of all subsidiaries, including Peninsular Electric Light Company. As a result, on July 2, 1915, the above-mentioned lots 76-89 in the Hart Farm Subdivision

passed into the hands of a unified and integrated Detroit Edison Company, along with the recently-completed substation.¹⁰

The construction of the Hart Substation represented part of Detroit Edison's long-range business development strategy for the production and distribution of electrical power throughout Detroit and the surrounding region.¹¹ In 1903-1904, Edison began to replace the old, small, and geographically dispersed electricity generating plants of the previously acquired companies with a new, centralized, coal-burning, plant southwest of Detroit in the village of Delray. By 1907 the Delray power plant was operating at maximum capacity. Construction on a second Delray plant began as Detroit Edison frantically tried to keep pace with mounting electrical demand, especially from the ever-increasing number of new industrial customers. In 1913-14, Detroit Edison made an effort to catch up with the Detroit's automobile-led economic boom by beginning construction on a third power plant, this time on the far east riverfront at Conners' Creek. The production at a few central power plants of tens of thousands of kilowatts of low-priced electricity, however, was only one dimension of the Company's strategy. The economies of scale represented by the Company's large power plants could not be realized without an efficient distribution system that increased market demand for electricity over a wide geographic area. This was precisely where substations like the one on Hart Street fit into the picture. The only way efficiently to transmit electrical current from central power plants over great distances was at high voltage. Therefore, throughout its expanding service area Detroit Edison required substations which simply stepped down (reduced) high voltage incoming current into lower voltage levels prior to delivery to customers. The Hart Substation converted 3-phase, 24,000 volt current which arrived at the facility via an underground transmission line into current which left at 4,800 volts, also via underground lines. Until the late-1940s, three motor-generator sets on the machine room floor at the Hart Substation also converted incoming alternating current into direct current for streetcar lines in its service area. At its height, the Hart Substation served a district approximately bounded by the Detroit River northwards to Warren Avenue, and from Van Dyke Avenue on the west to Alter Road.¹²

Responsible for building many of Detroit Edison's structures in the early 20th century, including the Hart Substation, was the Albert A. Albrecht Company, a local Detroit contractor since the mid-1870s.¹³ Indeed, Detroit-born Albert Albrecht (1853-1936) was one of the city's most celebrated builders. Downtown projects included the old Public Library (1877); the old Masonic Temple (1894); the Union Trust building (1894-95), Detroit's first modern steel-skeleton building); Detroit Opera House (1898); the Penobscot building (1905-1928); and the Madison

DETROIT EDISON: HART SUBSTATION
HAER No. MI-25 (Page 6)

Theater (1916). The Albrecht firm also built Cass Technical High School, the Detroit Yacht Club, Harper & Grace hospital, and Henry Ford hospital. Significant industrial projects in the early 20th century included plants for Parke, Davis & Company (ca. 1900), the leading pharmaceutical manufacturer; Detroit Steamless Steel Tube Company; Detroit Copper and Brass Company; Timken-Detroit Axle Company; Morgan and Wright Company (1905), the local rubber tire manufacturer; the plant and part of the office building of Lincoln Motor Company (1917); and the first structures for Packard and Cadillac automobile companies (1903-1905). In addition, according to the Detroit News, since July 6, 1898, Albrecht "has held a contract with the Detroit Edison Company under which he has been building all their branch buildings and power plants."¹⁴ These included Edison power plants No. 1 (1903-1904) and No. 2 (1907) at Delray, and No. 3 (1913-21) at Conner Creek, as well as the Hart Substation for which the A.A. Albrecht Company obtained a building permit on June 16, 1914.¹⁵

As built in 1914 the two-story Hart Substation measured 65 feet along Waterloo (later changed to Vernor) and 130 feet along Hart.¹⁶ Detroit Edison substations of the period, including the one at Hart Street, were not entirely functional in appearance. Indeed, they exhibited a range of classical architectural features: engaged columns, scrolls, bracketed cornices with widely overhanging eaves, dentils, and roof-line parapets.¹⁷ What differentiated the Hart Substation from others was the large amount of space on the Hart and Vernor facades devoted to windows.¹⁸ This brought in plenty of natural light during the day, and lent the building an airy appearance as well. Alterations to the building in 1941-42 fundamentally changed this.¹⁹ The large window sections were filled in with brick; the ornate brackets, scrollings, and cornice surrounding the main front door were removed; the staircase leading to the door was rebuilt; and the roof-line parapet was levelled flat. By this time the Hart Substation was not only more functional in appearance, it was also larger. In 1927-28, a \$110,000 two-story addition to the original structure was erected along the southern end and to the back of the building on the west, where eight new transformer rooms were constructed. The substation's dimensions expanded to 167 feet along the back and 84 feet along Vernor.²⁰

PART II: DESCRIPTION OF THE DETROIT EDISON HART SUBSTATION

The Detroit Edison Hart Substation is a two-story, steel and reinforced-concrete structure located on the southwest corner of the intersection of East Vernor and Hart on the far east side of Detroit. The building is approximately 43 feet in height. Basically rectangular in shape, the substation measures 167 feet long on the west and 84 feet wide along Vernor. However, a small section of the rectangle (25' x 35') is missing from the southeast corner of the building; therefore, the principal facade along Hart--representing the original 1914 construction--is only 130 feet in length.

The exterior of the substation is sheathed in brown-colored brick. Ornamentation is confined to the Hart and Vernor facades. A thick horizontal band made of white stone divides the base from the building's main body. Basement-level windows still remain on the Hart facade; those along Vernor were replaced with brick in the early 1940s. The body of the substation extends over both stories. It consists of a series of 13.5 foot wide bays: six along Hart and four on Vernor (of which the western most was part of the 1928-29 addition). Bays are framed by sections of brick, each inlaid with a pair of vertical shafts of white stone which create the impression of columns that begin at the base and rise to support the repeating brick-made arches located just below the cornice line. Before the 1940s, the large recessed brick panels at the center of the bays contained multiple-pane windows (the bottom halves consisted of four panels which opened to the inside). The stone window ledges were left intact. The remaining upper sets of windows--two panels on each swing outward--are from the original installation. At intervals the green-painted concrete cornice features a pair of brackets which appear to support the widely overhanging eaves. A streamlined stone-coped parapet rises over the cornice along the Hart and Vernor facades. Alterations in the 1940s led to the levelling off of the corners of the original parapet, as well as to the rebuilding of the staircase and reconstruction of the area surrounding the main front door at the northeast corner of the structure. The elaborately bracketed and scrolled entrance was removed, replaced with brick, and a single steel door installed. The wooden door at the southeast corner remains unaltered.

The southern facade is a massive brick construction, uneventful except for a small lone window located in the middle. The rear of the building is similarly functional in design. All eight of the transformer rooms are serviced by wooden doors which allow for the removal and installation of machinery. Ventilation for the transformer rooms is provided by panel openings and hoods in the doors and by rectangular vents located just above the doors. All of the windows in the building assist in drawing off heat

produced by the substation's machinery, as do two long rows of wind-activated turbines located on the roof.

The interior of the Hart Substation includes three levels: a basement about 9 feet deep through which electrical cables enter and leave the building; and two stories above ground. Walls either are made of brick or concrete; floors, ceilings, and the roof are made of concrete. The single largest space in the building is the machine room: it measures 40 feet wide, 160 feet long at its greatest extension, and reaches from the floor to the roof. A large overhead crane with a capacity of 50,000 pounds can travel most of the length of the machine room. Built around 1915 by the Northern Engineering Works of Detroit, the overhead crane originally facilitated maintenance of three motor-generator sets which produced direct current for the local streetcar system. Arranged in a single row beneath the second story balcony overhang is the principle extant equipment in this room: the original marble panels upon which rest volt meters, watt/hour meters to record usage, fuses, mechanical circuit breakers, and other control and monitoring devices. Many of the meters are original. An operator's office and two phone booths stand at the northern end of the machine room.

The Hart Substation includes a mixture of equipment of different vintages, with relatively little of the original installation still intact. The circuit breakers located on the first floor between the machine and transformer rooms, for example, are solenoid-operated Westinghouse Type B-26 oil-filled breakers, rated at 600 Amps at 7,500 volts, but they in fact operated at 4,800 volts. The latest patent date on the nameplate is 1925.

Eight pairs of transformers and voltage regulators are situated on the west side of the building on the ground floor. There are eight Ferranti Packard Transformers, Class OW, rated at 10,000 KVA, 3 Phase, all built in 1970 in Toronto, Canada. These are paired with eight Westinghouse induction type voltage regulators, rated at 6,000 KVA, 3 Phase, at 4,800 volts. This type of voltage regulator features a motor-driven shiftable "rotor" coil which shifts to achieve optimum inductive coupling. These voltage regulators may well be the original equipment, since the last patent date shown on the nameplate is 1915. They are capable of varying the output voltage plus or minus 10%. Voltage adjustment was needed to match shifting load throughout the day or week.

In addition, there are seven Westinghouse induction type voltage regulators, Type D, rated at 300 KVA, 3 Phase, 4,800 volts, located on the second level of the substation. These can handle a secondary current of 720 amps at 220 volts (5% regulation) or 360 amps at 480 volts (10% regulation). The last patent date for

DETROIT EDISON:HART SUBSTATION
HAER No. MI-25 (Page 9)

these regulators is 1928. The two sets of voltage regulators worked in tandem; the main, large ones "pre-setting" the voltage to each of the eight 4,800 volt main circuits and the smaller ones further regulating the branch circuits.

NOTES

1. Sidney Glazer, Detroit: A Study in Urban Development (New York: Bookman, 1965), pp. 129-30.
2. Clarence Burton, City of Detroit, I, pp. 337-347; Silas Farmer, History of Detroit, p. 35.
3. Wayne County Tract Index, Book No. 858; Polk, Detroit City Directory, 1902, passim; Marquis, The Book of Detroiters, entries for Gilbert Hart (1908 edition) and Thomas Berry (1914 edition).
4. George William Baist, Baist's Real Estate Atlas Surveys of Detroit, Michigan (Philadelphia: Baist, 1906).
5. Sanborn Map and Publishing Company, Insurance Maps of the City of Detroit, Michigan (New York: Sanborn Map and Publishing Company, 1910).
6. Sanborn, Insurance Maps of Detroit, 1916.
7. Ibid.
8. Wayne County, Register of Deeds, Liber 873, p. 376, (recorded July 9, 1913).
9. The complex history of the origins and early development of the Detroit Edison Company is told in Raymond Miller, Kilowatts at Work: A History of the Detroit Edison Company (Detroit: Wayne State University Press, 1957). Discussion of Edison history in this paragraph is based on Miller, pages 50, 74, and 135.
10. Wayne County, Register of Deeds, Liber 1059, p. 1, (recorded July 2, 1915).
11. For the following discussion of Detroit Edison's early development strategy, see Miller, Kilowatts at Work, pp. 52-53, 95-96.
12. Phone conversation with Harold Ellison of Detroit Edison Company, 5 January 1988.
13. On Albert A. Albrecht, see Clarence Burton, City of Detroit, III, pp. 467-68; and A.A. Albrecht Reading Room File, Burton Historical Collection, Detroit Public Library.
14. Detroit News, July 4, 1933, in Albrecht, Reading Room File.

DETROIT EDISON:HART SUBSTATION
HAER No. MI-25 (Page 11)

15. City of Detroit, Building Permit No. 2852, June 16, 1914.
16. Sanborn, Insurance Maps of Detroit (1916), XI, plate 22.
17. For comparisons with the Hart Substation, see the following Detroit Edison photographs at Henry Ford Museum, Dearborn, Michigan: Wayne substation (Negative No. 2013-15, 18 December 1913); Grand River substation (Negative No. 2260, 30 March 1914); and Bellevue substation (Negative No. 2246, 25 March 1914).
18. This is particularly obvious in Detroit Edison Negative No. 2976, 8 March 1915, Henry Ford Archives, Dearborn, Michigan.
19. City of Detroit, Building Permits No. 580, 3 December 1941; and No. 3919, 3 March 1942.
20. City of Detroit, Building Permit No. 14367-A, 10 November 1927; Sanborn, Insurance Maps of Detroit (1929), XI, plate 21.

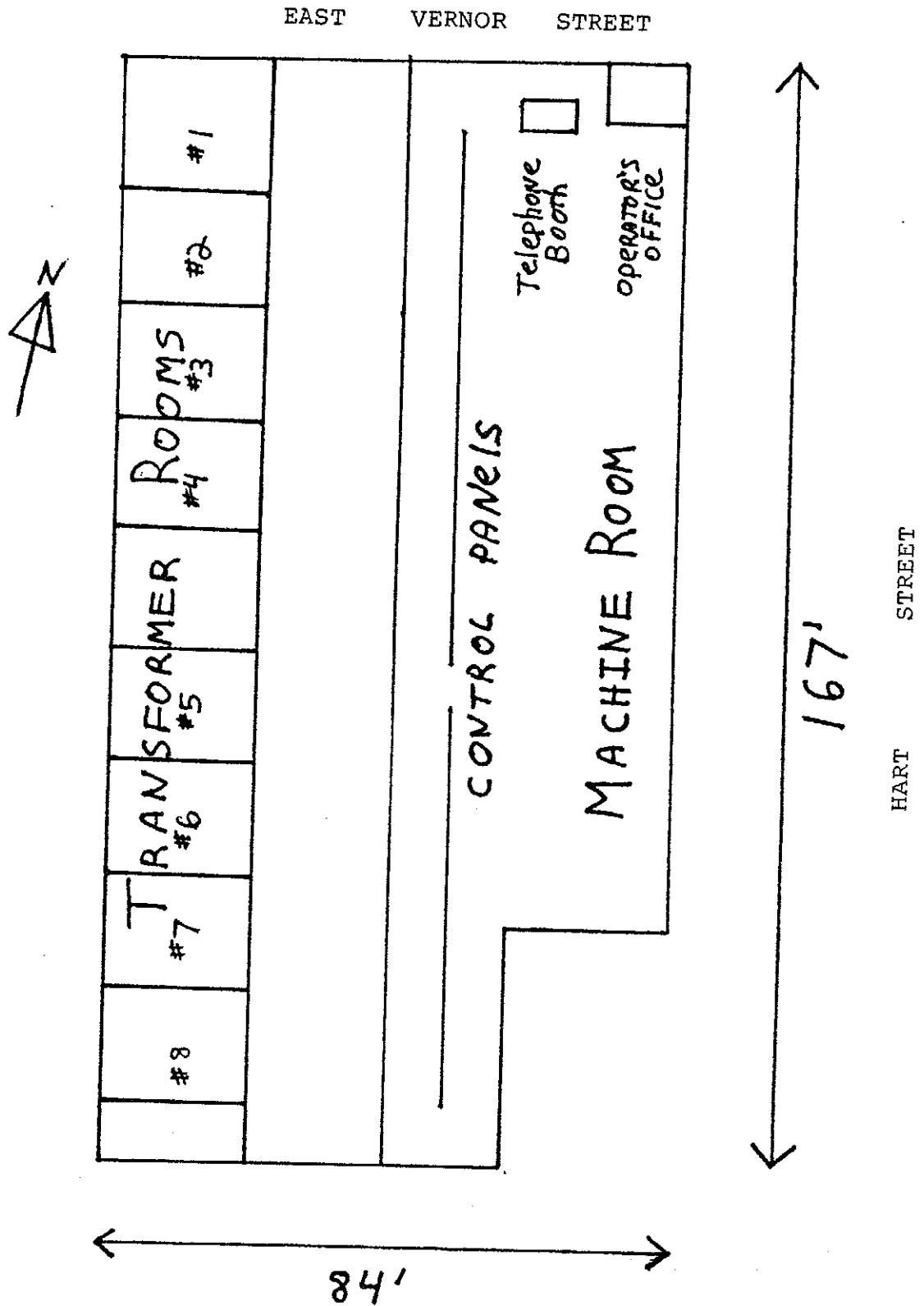
SOURCES OF INFORMATION

- Albrecht, Albert A. Reading Room File, Burton Historical Collection, Detroit Public Library, Detroit, Michigan.
- Baist, George William. Baist's Real Estate Atlas Surveys of Detroit, Michigan. Philadelphia: Baist, 1906.
- Burton, Clarence M. The City of Detroit, Michigan, 1701-1922. Detroit: S.J. Clarke Publishing Company, 1922.
- Detroit, City of. Building Permits. Department of Building and Safety Engineering. City-County Building, Detroit, Michigan.
- Detroit Edison. Construction Drawings. Supervisor of Engineering, Detroit Edison Company, 2000 Second Avenue, Detroit, Michigan.
- Detroit Edison. Photographs and Negatives. Henry Ford Museum, Dearborn, Michigan.
- Ellison, Harold. Phone conversation with Thomas A. Klug, 5 January 1988.
- Farmer, Silas. History of Detroit and Wayne County and Early Michigan. Detroit: Silas Farmer & Company, 1890.
- Glazer, Sidney. Detroit: A Study in Urban Development. New York: Bookman, 1965.
- Marquis, Samuel S. The Book of Detroiters. Chicago: S.S. Marquis Company, 1908 and 1914.
- Miller, Raymond. Kilowatts at Work: A History of the Detroit Edison Company. Detroit: Wayne State University Press, 1957.
- Polk, Ralph L. and Company. Detroit City Directory. Detroit: Polk & Company, 1902.
- Sanborn Map and Publishing Company. Insurance Maps of Detroit, Michigan. New York: Sanborn, 1910, 1916, and 1929.
- Wayne County, Register of Deeds. Land Tract Index, Book No. 858. City-County Building, Detroit, Michigan.

BELLE ISLE, MICHIGAN, QUADRANGLE
UTM: 17.337770.4692880

BELLE ISLE, MICHIGAN, QUADRANGLE
UTM: 17.337770.4692880





SITE PLAN